

# Mobile Devices: Dominant Design as a Goal

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and Management**

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## PROYECTO FIN DE CARRERA

TEMA: ESTUDIO SOBRE LA EVOLUCIÓN DE LOS DISPOSITIVOS MÓVILES A TRAVÉS DE UN DISEÑO DOMINANTE, CUALES SON LOS PASOS QUE SIGUEN LAS EMPRESAS Y COMO RESPONDE ANTE ESTOS EL MERCADO.

TÍTULO: MOBILE DEVICES: DOMINANT DESIGN AS A GOAL

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### RESUMEN DEL PROYECTO:

Desde la aparición de los Smartphones en los años 80, el mercado de los dispositivos móviles ha crecido y evolucionado hacia dispositivos cada vez más conectados, con hardware cada vez más cercano a los ordenadores de sobremesa y portátiles que al clásico teléfono móvil. A día de hoy, el mercado está saturado y algunas compañías parecen dubitativas ante el próximo paso a seguir. De esta manera, el concepto del diseño dominante aparece en el mercado como una solución a esta dificultad. El primer capítulo de este estudio se centra en establecer, a modo de introducción, los antecedentes al caso a estudiar, el objetivo de la tesis con sus limitaciones y delimitaciones, así como la metodología utilizada. También se plantean las preguntas principales (Research Questions) sobre el objetivo de la tesis, las cuales darán respuesta en la conclusión final al caso de estudio. Este proyecto tiene como objetivo establecer un análisis y definición sobre que es un diseño dominante y qué deberíamos entender como tal: ¿cuáles son las necesidades y las exigencias de los clientes? ¿Cómo se puede relacionar esta información con el diseño dominante en el sector tecnológico? ¿Cuáles son las estrategias de las empresas antes de diseñar un nuevo dispositivo? ¿Usan un concepto o modelos similares a un diseño dominante?

Posteriormente, el segundo capítulo expone la bibliografía utilizada, y el enfoque analítico que se llevará a cabo con las 3 principales fuentes de datos. La investigación enfoca su análisis en un marco teórico, basado en publicaciones y bibliografía relacionadas con la innovación y el marketing, para luego comparar el modelo estudiado con un marco empírico: datos obtenidos de encuestas a consumidores, entrevistas a profesionales del sector de los dispositivos móviles, y diferentes prototipos y nuevos

proyectos en este mercado. Entre esta literatura se encuentran manuales de marketing como “22 Immutable laws of Marketing” (de Al Ries & Jack Trout), publicaciones sobre el sector industrial de la tecnología y negocios: “Crossing the Chasm” de Geoffrey A. Moore y modelos de innovación entre otros como “Mastering the Dynamics of Innovation” de James M. Utterback.

El tercer capítulo corresponde al estudio del marco teórico de la tesis, donde se analizará principalmente el modelo de innovación utilizado (el modelo cíclico de Utterback) y varios principios de marketing aplicados a este sector. Se plantean las bases de este modelo, la definición que el propio Utterback ofrece sobre el diseño dominante, y las 3 fases del proceso del mismo (Fluid Phase, Transitional Phase y Specific Phase), donde las empresas cambian de estrategia según las circunstancias evolutivas del dispositivo, su posición respecto el líder del mercado, o los procesos de estandarización y de costes. Por último se plantea la base para el desarrollo del diseño dominante en un ciclo evolutivo constante en el tiempo.

Respecto a la parte más analítica de la tesis, el cuarto capítulo se desarrolla a partir de los datos obtenidos de las fuentes de información en el marco empírico de estudio. Se obtienen conclusiones sobre los datos realizados en ambas encuestas (en Español e Inglés) y sobre la relevancia de esta información; se estudian uno por uno hasta cuatro casos de nuevos dispositivos a corto-medio plazo en el mercado y se obtienen unas conclusiones globales sobre las entrevistas realizadas a los profesionales del sector y la relevancia de todas estas informaciones.

En el quinto capítulo de la tesis se desarrolla la discusión en torno a los marcos teórico y empírico utilizados, para concluir respondiendo a las “Research Questions”, definiendo de esta manera el concepto de diseño dominante y comparando esta definición con la situación real del mercado. Se contrastan las bases del modelo de Utterback con los datos obtenidos en el capítulo cuarto, enfatizando la comparación entre las fases de este modelo con la realidad obtenida a través del estudio. Las encuestas realizadas a los consumidores se enmarcan en la segunda y tercera fase del ciclo, donde el desarrollo del diseño dominante ya está establecido y más desarrollado, mientras que las entrevistas unifican varios puntos clave a tener en cuenta en la primera y segunda fases, orientándose a las capas previas del proceso. Después se comparan uno a uno los 4 dispositivos analizados, a fin de establecer su jerarquía dentro del mercado, como posibles nuevos diseños dominantes o evoluciones especializadas de otros que ya aparecieron en el mercado con anterioridad. Así mismo, en esta parte final del estudio se comparan entre sí los resultados similares entre las tres fuentes de datos, y se analiza la veracidad de todas las fuentes consultadas.

Finalmente, se han registrado en un sexto capítulo todas las referencias utilizadas en este proyecto, tanto publicaciones bibliográficas, entrevistas, citas de personajes relevantes del sector y enlaces en la red sobre noticias relevantes. En el apartado de apéndices se adjuntan tres anexos, donde se adjunta información utilizada en el caso de estudio, y la cual se ha obviado del texto principal con el objetivo de agilizar la lectura y la comprensión del mismo. Estos tres apéndices corresponden a las dos encuestas realizadas en ambos idiomas y la entrevista realizada a los profesionales del sector de los dispositivos móviles.

## AGRADECIMIENTOS

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Me gustaría agradecer todo el apoyo y ayuda recibidos durante estos años, y durante el proceso de estas tesis y el proyecto fin de carrera, a mis familiares y a los amigos que siempre han confiado en mí, y siempre han estado a mi lado.

En especial quiero dedicársela a mis padres, que me han enseñado y demostrado todo lo que sé, a mi abuela Merche, porque todo su cariño y dedicación no pueden contarse con palabras, y a mi abuelo Justo, el mejor “ingeniero” que he conocido, cuyo recuerdo y amistad son el mejor regalo antes y después de que este proyecto se hiciese realidad.

Miguel Jesús Alija Fuertes – Junio 2013

# MOBILE DEVICES: DOMINANT DESIGN AS A GOAL

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### ***Abstract***

Since the beginning of the smartphones in the 80s, the mobile device market has grown and evolved towards devices connected everywhere, with hardware more and more close to computers and laptops than a classic mobile telephone. Nowadays, this market seems to be crowded and some companies seem not to know exactly which step is next. In this manner, a concept appears in the market as a solution or a difficulty to overcome: the dominant design. The thesis aims to establish an analysis and definition of what a dominant design is and how we should understand this concept: which are the costumers' demands and needs? How can we relate this information with the dominant design? What is the strategy of the firm before designing a device? Do they use a concept similar to a dominant design?. The research base its analysis in a theoretical framework based in innovation and marketing literature, to then compare the model studied with data collected from surveys made to customers, interviews made to workers of the mobile device market, and different new projects on the market. The research finishes with a discussion about the theoretical and the empirical frameworks, and concludes replying the research questions, and defining a dominant design and its current situation in the market.

**Key-Words:** Dominant Design, Utterback's Model, Smartphones, Market Share, Innovation, Mobile Devices, Product Performance, Innovative Process.

*Here are the lists of Abbreviations that are used in this thesis.*

## ***Abbreviations***

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<i>IHS</i>	iSuppli Mobile Handset Cost Model Service
<i>OS</i>	Operating System
<i>APP</i>	Application
<i>HTML5</i>	<b>H</b> yper <b>T</b> ext <b>M</b> arkup <b>L</b> anguage, version 5
<i>LTE</i>	Long Term Evolution
<i>LTD</i>	Limited Company
<i>PDA</i>	Personal Digital Assistant
<i>R&amp;D</i>	Research & Development
...	...

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*This chapter aims to give a short introduction about the growth of mobile devices market, which purpose and objectives have the thesis, and establish the research delimitations and limitations.*

## **1.1 Background**

The 80s became the golden age for domestic electronics and media. Personal computers invaded homes and offices worldwide, with some successful milestones as the launch of the successful personal computer “Macintosh 128KB” (1984) [1] and the first Microsoft’s operating system (OS): “Windows 1.0” (1985). A new market and an important tool born following the steps of the “IBM PC” (1981) when IBM Inc. started the most famous microprocessor architecture in history, the IBM x86, which is still used in mostly of domestic microprocessors. There was a long period where computers became the most important tool for work and leisure, they filled homes and companies, and some markets appeared due this phenomenon: companies engaged to video-games, gadgets, specialized software, hardware... Their kingdom peaked when Microsoft Corp. set the record of the most valuable company in 1999 at stock exchange, as then Apple Inc. surpassed this record in August 2012, when pushed its market capitalization beyond US\$ 620-billion [2].

Nowadays, the computer’s empire had expired and a new age of business and technology industry started, when IBM presented the first smartphone for companies in 1993 [3], and Steve Jobs, chief executive of Apple, presented the first commercial smartphone in history (year 2007 [4]). Cell phones market grew faster during the late 20<sup>th</sup> century and it became the most powerful market together with computers, where mobile devices dominate the scope of the worldwide mobile internet.

As an example about the relevance of mobile phones, a report made by the International Telecommunication Union (ITU) in 2012, looked at 155 countries assessing their access to and use of information and communication technology [5], reported this facts showing six billion mobile phone subscriptions in the world at the end of 2011 (there are nearly seven billion people on Earth).

In the world, as a big market where small companies can develop their own mobile devices (like the Spanish BQ) [6], the dominant design of mobile devices is converging to a single design, where computers, cell phones, media devices and the internet become reality on smartphones,

tablets, convertible computers, which supplanted client PCs for the last 10 years, selling more than common computers: 488 million smartphones in 2011 against, compared to 415 million client PCs (including erroneously the Tablet PCs into the 415 million of client PCs) [7]

**Worldwide Smartphone and Client PC Shipments (in millions)**

	<b>4Q11 Shipments</b>	<b>Q4 10/11 Growth</b>	<b>2011 Shipments</b>	<b>2010/11 Growth</b>
<b>Smartphones</b>	158.5	56.6%	487.7	62.7%
<b>Total PCs:</b>	120.2	16.3%	414.6	14.8%
<b>- "Pads"</b>	26.5	186.2%	63.2	274.2%
<b>- Netbooks</b>	6.7	-32.4%	29.4	-25.3%
<b>- Notebooks</b>	57.9	7.3%	209.6	7.5%
<b>- Desktops</b>	29.1	-3.6%	112.4	2.3%

Many companies as Dell, Ubuntu, BQ, and Intel, which never pointed topics like mobile O.S. or its hardware, follow today this direction developing software, smartphones, tablets and other “own devices” that will be the largest technology market, developing areas where they had never taken part, and where companies as Google try to conquer all possible levels through its operating system, mobile devices, being a mobile network operator, etc. [8]

## 1.2 Purpose

Today's world of computers and mobile devices are nearly saturated, and manufacturers try to fill the market with similar devices in order to find the formula of success. However, reality shows that customers are not completely satisfied and some companies use to develop their own devices and solutions, as they have to adapt these tools at their professional needs. On the other hand, most costumers have similar devices which operate in like manner and the market starts not to know in which direction should take the next step. It is a decisive stage for the company, where concatenate several commercial errors would be a financial imbalance for the company, maybe including the total bankruptcy.

In this manner, the need of a dominant design appears as an instrument to guide customers when considering a new device for their needs, and guiding companies about how to develop a new device following their own philosophy about a dominant design. But what is a dominant design? And what should we think about dominant design? Are they static, and standard, a set of rules forever changing in time? Mobile device market is constantly evolving as business market so it is impossible to establish immutable laws of what is or what should be a dominant design for companies. This means how they focus their devices on market, and which are the steps needed during a full development project for a commercial success.

What about commercial results? They are not always in favor of companies. Companies like Motorola and Nokia, which were on top short time ago, went bankrupt or they are having problems to adapt themselves to the market requirements. Some experts still ask themselves how Nokia could overlook the touch screen and keep it OS so long. They were focusing on a different direction... maybe in their own idea about a dominant design? In counterpoint, Apple got the first chance with its iPhone... and a lot of companies tried to follow their steps with more or less success... and some of them reached the sales top on market, but they got into a war of patents, as Samsung, LG, Sony and others did. This patent portfolio race is increasing every year for mostly of consumer electronics companies [10].

Reality is that a dominant design is demanded by both companies and private customers, and the innovation is required to avoid this chasm. As Geoffrey A. Moore says in his book *Crossing the Chasm*, there is a niche market where business innovation with marketing, like a principal strengths, can lead IT companies until a new status where establish successfully a new product range: *"That's it. That's the strategy. Replicate D Day, and win entry to the mainstream. Cross*

*the chasm by targeting a very specific niche market where you can dominate from the outset, force your competitors out of that market niche, and then use it as a base for broader operations”* (Geoffrey A. Moore - Crossing the Chasm – Page 49).

Al Ries and Jack Trout discuss this formula among other facts in their first immutable law of marketing, the law of Leadership: *“The basic issue in marketing is creating a category you can be first in. It's the law of leadership; It's better to be first than it is to be better; It's much easier to get into mind first than to try to convince someone a better product than the one that did get there first.”* (Al Ries & Jack Trout - 22 Immutable Laws of Marketing – Page 3).

Mobile devices market, with the smartphone as its king, is getting crowded stores with millions of devices, sometimes quite similar between them, and some patent wars are starting between the biggest companies of this market: Samsung with its family called “Galaxy” and hundreds of relative devices, Apple with its deluxe models of iPhone, Sony with the Xperia family, and others actors which are getting into this war intermittently. All of them joined a race for the most powerful device and the most attractive design, where the Korean companies as LG and Samsung bet for the biggest screen as possible. Other companies like Sony are betting for a medium-high range of quality for their devices, although with thousands of problems for the costumers to make difference between them, as differences between models are a few and sometimes confused (there is not a clear offer/catalogue to the customers).

On the other side of the sales, there is a medium size market with more clear choices. Most of them are similar copies of their respective devices at the smartphones market, but for the last 2 years new ranges of tablets are conquering homes and offices: 7” size, 10” size, 11” size, tablets + keyboard.

Companies seem to lose their market objectives and they are forgetting some marketing rules, as The Law of Perception of Al Ries & Jack Trout (“22 Immutable Laws of Marketing”) says: *“It's an illusion. There is no objective reality. There are no facts. There are no best products. All that exists in the world of marketing are perceptions in the minds of the customer or prospect. The perception is the reality. Everything else is all illusion.”*

(Al Ries & Jack Trout - 22 Immutable Laws of Marketing).

Samsung is today selling more smartphones than its principal competitor, Apple, which was the first successfully seller of smartphones and which designs are followed and dominant until today: *“Besides the Galaxy line, Samsung's phones include Conquer, Replenish, Focus and*

*Indulge. IHS estimates that Samsung sold about 40 different models during the third quarter. By comparison, Apple had just two — the 4 and the 3GS.”*

(Behind the numbers: why Samsung sold more smartphones than Apple) [9]

What is a dominant design or what should we understand about that? Can we say that the market is evolving toward a dominant design? Why? How important is the innovation in the market?

## **1.3 Delimitations and Limitations**

### **DELIMITATIONS**

This thesis focus on mobile devices, mainly in smartphones and tablets as they are the most important sold items, although other mobile devices related with them also take place in the research delimitation:

- Mobile devices, mainly smartphones and tablets, focusing in the general specifications of the most dominant designs.
- Present devices and prototypes in the market together designs for the next 1-3 years.
- Developing technologies of mobile devices aiming to a dominant design.
- Patents, new software and marketing keys which take place in the scope of dominant designs.

### **LIMITATIONS**

Although we will find most of limitations during the research, we can define some principal difficulties that we can find before the process:

- Lack of access to confidential data on new technologies and new devices.
- This research is focused on the dominant designs. Without the human and technical resources at the disposal of the large companies, gets quite difficult to get deeper on the research.
- We can't predict what will happen tomorrow, as we don't know if a new technology will be developed or what will be the trend of the market in a period of time bigger than 3-5 years.
- Developing of marketing and technology design projects use to take long time more than the expected time of this thesis.

- The difficulty of setting the standards and conditions for the dominant device in a diversified market, where small companies have on market access and the patent fight new block differentiators.

## **1.4 Method & Research Questions**

Establish an analysis and definition of what a dominant design is and how we should understand this concept: which strategies follow the companies before designing a device, how they face the market, if they have a brand image philosophy, or if they use a common concept in their projects. It also analyzes the costumers' needs: how the costumers respond to the market, which are the most famous devices and specifications for costumers, and how can we relate this information within the concept aimed: the dominant design.

The hypothesis (the empirical framework) will contain surveys, interviews and several data collected from the market: news, reviews, sales charts, forums... Analyzing concepts of marketing, innovation and real cases, contrasting them with the theoretical innovation model, the thesis attempts to take a step forward in the mobile device market, responding to the guidelines to create, deliver and create value in the IT world: "A business model describes the rationale of how an organization creates, delivers, and captures value "(Osterwalder A. and Pigneur Y. (2009) Business Model Generation – Page C.12)

This theoretical dominant design, made from the Utterback-Abernathy's innovation model (James M. Utterback "*Mastering the Dynamics of Innovation*") and contrasted with the hypothesis in the empirical research, tries to investigate how the mobile device market grows and evolve today, aiming to describe the concept on which is developing the mobile device market focusing on innovation: the dominant design.

In order to fulfill the purpose of this thesis, the following research questions will be answered:

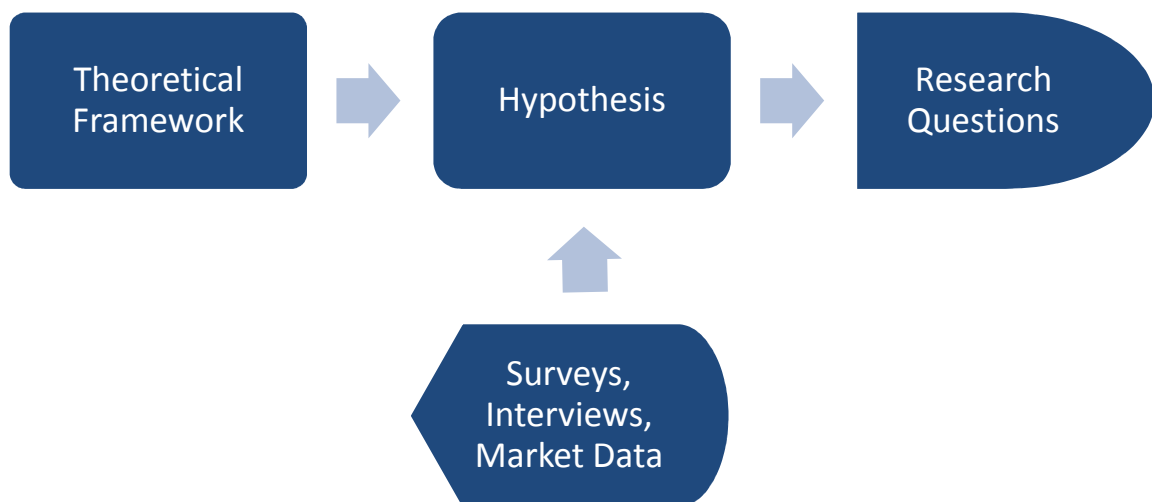
- 1- Which are the costumers' demands and needs? How can we relate this information with the dominant design?
- 2- What is the strategy of the firm before designing a device? Do they use a concept similar to a dominant design?

## 2 FRAME OF REFERENCE

*The reference frame is a summary of the existing knowledge and former performed research on the subject, as a brief explanation about obtaining data and how to relate the theoretical framework and the empirical framework, to then deliver the conclusions based in a reliable and validity research.*

### LITERATURE STUDY

The literature sources for this research are six publications based in several fields, all converging together in the same market sector. The fields of the sources are: marketing, innovation and high-tech products, where a famous innovation model will be used as structure of the theoretical framework (the Utterback's innovation cycle, extracted from "Mastering the Dynamics of Innovation – How Companies Can Seize Opportunities in the Face of Technological Change, James M. Utterback"). Marketing and business generation (on high-tech products) will complete the theoretical framework. After that, the hypothesis of the research will be established with the data collected, and contrasted with this theoretical framework, in order to reply the research questions and discuss the concepts studied. There will be always the possibility to open new fronts and read new sources of information about innovation, high-tech business and marketing tools focused at the industrial management field and mobile device market.



## DATA ANALYSIS - HYPOTHESIS

Data will be collected mainly from the surveys (pointing the customers' needs), interviews made to workers of the mobile device sector, and less extent from news at the company's websites, forums, reviews, and specialized websites (the data from the market which will be treated as half the half from customers and companies sources). New designs and technologies pointed by companies for future devices will be commented and analyzed, in order to compare the different dominant designs aimed from the companies in the near future. All data collected will integrate the main hypothesis which will reply the research questions together the theoretical framework as guideline. Conclusions and discussions will be presented in another chapter as the results of the research.

## INTERVIEWS

Interviewees are chosen as another source of information and knowledge about mobile device companies and their experience with IT technologies. The purpose of these interviews is to come deeper into company ecosystem and strengths, to then contrast the theoretical model made with the literature review with them. Within the interviewees chosen will be engineers, IT managers and academics who are working at the mobile device market.

## SURVEYS

ITU's research of the year 2011 reported that around 6 billion of SIM cards are working all over the world [5]. As a statistic data tool, surveys will be a characteristic data where the unforeseeable human behavior could be contrasted with the theoretical framework designed from the marketing process, and the acquired knowledge about how the market works.

Surveys will consist in small forms of 10 questions related with customers' needs, brand concepts, technology knowledge and other key points (all related with mobile devices) which will be analyzed as graphical format and compared with the expected data. Then, we will be able to perform the "strong-points list" from all data collected and guess which characteristics of the mobile devices are more demanded by customers. Thus customer choices get relevance: *"A - technological trajectory- is the path of progress established by the choice of a core technical concept at the outset. Decisions about the product, constrained by prior technical choices and by the evolution of customer choices, influence these various trajectories"* (Mastering the Dynamics of Innovation, James M. Utterback)



### 3 THEORETICAL FRAMEWORK

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*In this chapter the working process is described. A theoretical framework is developed and its purpose is to help the researcher/developer/designer to reach the goals for the project.*

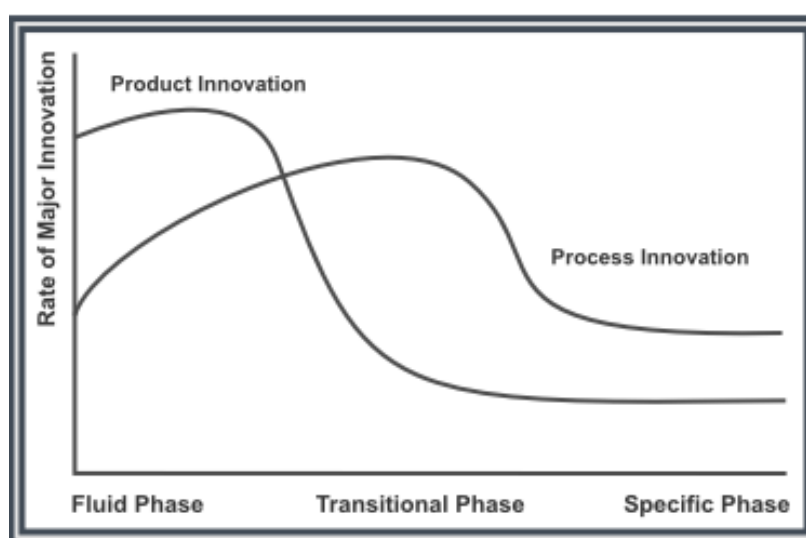
Today the market is evolving briefly and the companies work hard to keep a place in the mobile device industry, while the market is mainly converging with other sectors as computers, laptops, PDAs, or game stations in hardware and software. Several dominant designs appeared during the last 3 decades although not all of them suffered the same fate over time. Innovation was in some patterns the Rosetta stone which let the projects succeed, but this is not an unfailing process: *“Over the years, scholars have observed patterns of successful industrial innovation, but the identification of patterns does not suggest that successful is entirely predictable. These patterns do, however, indicate that relationships exist between product and process changes”* says James M. Utterback in his book -Mastering the Dynamics of Innovation-.

The complex concept of the dominant design, aim of this research, appears as an industrial standard mixture of experimentation and competition, where marketing, and the Utterback’s model takes place, modeling a pattern between the product and process changes: *“a pioneering firm gets the ball rolling with its initial product, a growing market begins to take shape around that product, and new competitors are inspired to enter and either expand the market further or take a chunk of it with their own product versions. No firm has a lock on the market”* (Mastering the Dynamics of Innovation, J.M. Utterback).

But what is a dominant design or what should understand about that? A dominant design, defined by Utterback, is: *“the one that wins the allegiance of the market place, the one that competitors and innovators must adhere to if they hope to command significant market following. A dominant design embodies the requirements of many classes of users of a particular product, even though it may not meet the needs of a particular class to quite the same extent as would a customized design”*. (Mastering the Dynamics of Innovation, J.M. Utterback)

For most of managers the question always is whether a dominant design can be seen or found. Several schools thought about this phenomenon, and tried to define it without being entirely right. Can we recognize a dominant design? Can we say that the market is evolving towards one?: *“It is doubtful that it can be recognized except in retrospect. Attempting to define or anticipate the appearance of a dominant design simply by mapping features and functions of the product alone is doomed to frustration”* (Mastering the Dynamics of Innovation, J.M. Utterback)

The innovation model presented by Utterback with the collaboration of W. Abernathy is a dynamic model, which creates a link together the characteristics of the product, process, competition, and organization (it describes the changing rates of product and process innovation over time). The development of the system passes through three main phases (Fluid Phase, Transitional Phase and Specific Phase) which each of them impact differently on single companies, on the market and on the capabilities and resources required to develop the innovation.



Fluid Phase: this is the first phase of the model, where a new innovation enters the market, providing new functionalities which were not provided before. After the introduction of the new product the competitors enter the market and sell comparable goods (the difference between goods comes from the product performance of each company. Goods are nonstandard as there is not a dominant design yet.): *“Technical uncertainty results from the diffused focus of research and development during the fluid phase. When the technology is in a state of flux, firms have no clear idea where to place their R&D bets”*. (Mastering the Dynamics of Innovation, J.M. Utterback).

In this phase is very important to conquer the customers, being the first to provide the new innovation product and converting this product in a key-word in the customer' mind. Al Ries & Jack Trout talk about that in their 22 Immutable Laws of Marketing, with the first law of marketing -The Law of Leadership-: *“It's better to be first than it is to be better”* and the third law -The Law of the Mind-: *“It's better to be first in the prospect's mind than first in the marketplace. Being first in the mind is everything in marketing. Being first in the marketplace is important only to the extent that it allows you to get in the mind first.”*

Transitional Phase: is this phase the dominant design is established and the innovation is accepted in the market: *“Market acceptance of a product innovation and the emergence of a dominant design are its hallmarks. Competitive emphasis in this phase is on producing products for more specific users as the needs of those users become more clearly understood.”* (Mastering the Dynamics of Innovation, J.M. Utterback). In this phase the product and the process innovations start to become more tightly linked.

The marketing laws of the Category and the Perception get importance in this second phase where the dominant design is established: *“If you can't be first in a category, set up a new category you can be first in”. “If you didn't get into the prospect's mind first don't give up hope. Find a new category you can be first in. It's not difficult. Everyone is interested in what's new. Few people are interested in what's better.”* (22 Immutable Laws of Marketing, by A.R. & J.T. in the Law of the Category); *“It's an illusion. There is no objective reality. There are no facts. There are no best products. All that exist in the world of marketing are perceptions in the minds of the customer or prospect. The perception is the reality. Everything else is all illusion.”* (22 Immutable Laws of Marketing, by A.R. & J.T. in the Law of Perception)

Specific Phase: now the competition starts between differentiation to product performance and costs. The production system is standardized and the cost reduction becomes the main priority for companies. The probability of new innovative products decreases hugely and both the product and the process innovation rates decrease and approach: *“the value ratio of quality to cost becomes the basis of competition. Products in the specific phase become highly defined, and the differences between products of competitors are often fewer than the similarities.” “The linkages between product and process are now extremely close. Any small change in either product or process is likely to be difficult and expensive and require a corresponding change in the other”.* (Mastering the Dynamics of Innovation, J.M. Utterback)

Technology innovations are in continuously change, and the innovation process repeats the pattern relating product and process focusing on the importance of the dominant design: *“innovation repeats the pattern of interlinking product and process innovation and the importance of the dominant design on the number of firms that the industry can support at one time”* (Mastering the Dynamics of Innovation, J.M. Utterback)

*In the results chapter the results that are obtained with the methods described in the frame of reference are compiled, analyzed and compared with the existing knowledge.*

### SURVEYS & RESULTS

As there are millions of mobile device users at the world and it's difficult to get a big sample about this phenomenon, the thesis aims to focus data from the university environment, and some professionals of this market (as all of them are potential users of new technologies). Surveys were made through a popular social network, and customers consulted were from different nationalities, mainly Spanish and Swedish.

Surveys consist on 10 short questions about dominant designs in mobile devices, some of them converted into multi-quote questions in order to get a bigger range of information. Two surveys were written in both Spanish and English, with the same questions in both languages, in order to get approximately the same range of answers. The number of surveys compiled was satisfactory, as the research reached the minimum number of expected surveys (100 samples), with approximately the fifty percent of surveys in every language (57 completed surveys in Spanish and 58 completed surveys in English).

We start analyzing the surveys question by question, to then conclude with global results. The English version of the survey can be found at "Appendix A" and the Spanish version can be founded at "Appendix B".

#### 1° Question: "How old are you?"

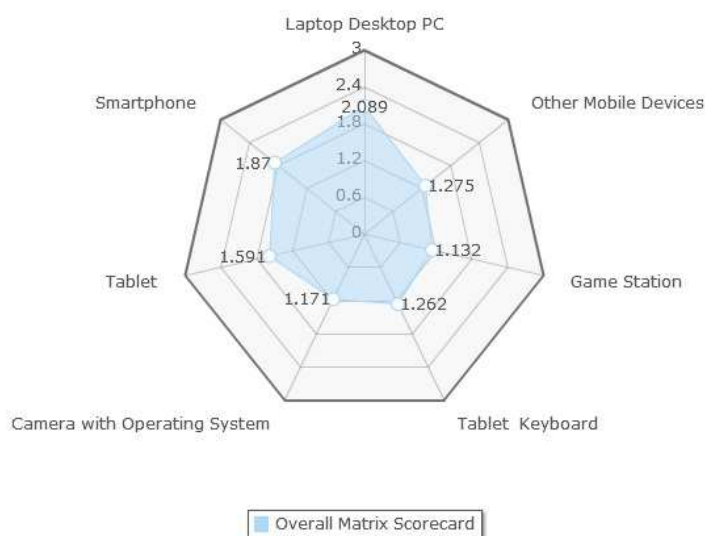
Mobile devices born 30-40 years ago, so the age of the surveyed is important to focus which range of population is a potential mobile device user. We try to locate which range of age is more interested about mobile devices and this question is also useful in order to use properly the data collected, as we will focus in a small range of age due the difficulty of make thousands of surveys. The higher ranks of age are between 19-25 (65% English survey, and 67% Spanish survey), and 26-30 (25% English survey, and 17% Spanish survey). This ranges of age use mainly more than 1 mobile device daily and they use to change their devices every 1-2 years.

## 2° Question: “Which mobile devices do you have?”

On one hand smartphones are the most popular device with the 52% (English survey) and the 91% (Spanish survey) as a principal device of use in daily life and jobs. Smartphones seem to replace computers and they are also taking a valued position connecting people everywhere, as a tool to manage all our electronic devices due their manageable size and connectivity. On the other hand, tablets get the 15% (English survey) and the 21% (Spanish survey), far away from the dominant empire of the smartphones.

## 3° Question: “Which of the following devices do you aim for your next purchase?”

This question suggest to respondents three choices for purchase a new mobile device, as “Most Likely”, “Likely”, and “Unlikely”. Top 3 at “Most Likely” is composed by Smartphones, Tablets and Personal Computers. In the Spanish survey there are values of 31%, 21%, 12% respectively, but the English survey changes with values very close between them, and the PCs getting the second place instead of tablets. The following graph shows properly the results and even the still highly relevant position of PCs. Smartphones appear again as the king of mobile devices.



## 4° Question: “How many mobile devices do you have?”

Customers strengthened the position of mobile devices answering “0 devices” with 1.79% and 0% of rate (English and Spanish surveys respectively). At the answer 2, 3, or 1 device, the percentages were 48%, 16%, 29% in the English survey and 35%, 16%, 46% in the Spanish survey. We notice than Spanish users prefer the combination PC + Smartphone than the International users, who prefer 2 mobile devices instead.

5° Question: “Do you know the following brands of mobile devices?”

This question tries to measure knowledge of the customers about the mobile device market. As some companies beat sale lists with their mobile devices and others fail their attempts, we can prove how important is the marketing when customers want to buy a new mobile device. It also influences in other customers as the most famous companies appear like “the best company with the best devices”. It’s important to know which brand was the first selling something (as Apple did with the iPhone), since is an important fact on marketing, as the The Law of Leadership of Al Ries and Jack Trout says (“22 Immutable Laws of Marketing”): *“It’s better to be first than it is to be better”*

We can see that the most famous brands are in order from highest to lowest: “Samsung, LG, Sony, Nokia, Apple, HTC, Motorola and Blackberry” in the English survey, and “Samsung, Apple, Nokia, Sony, Blackberry, LG and Motorola” in the Spanish survey. We should notice that in the first one, Apple is not so famous as others, but today it’s the largest seller of smartphones in the world (the brand is more famous due the name of their devices, “iPhone”), and others like Motorola is still famous despite they had some economic problems before Google bought it.

6° Question: “Which screen sizes do you prefer?”

Both surveys show the small/medium sizes as the preferred choices. These sizes belong mainly to smartphones but they are also getting bigger sizes close to other devices. Sizes between 3”-4.5” and 4.6”-6.9” inches had the 24% of votes in the English survey and in the Spanish survey 3”-4.5” had 24% and 4.6”-6.9” had the 47%. Smartphones and small tablets appear like the principal sizes in the customers’ choices.

7° Question: “Nowadays there are a variety of mobile devices. Do you think that they will evolve into a single dominant design?”

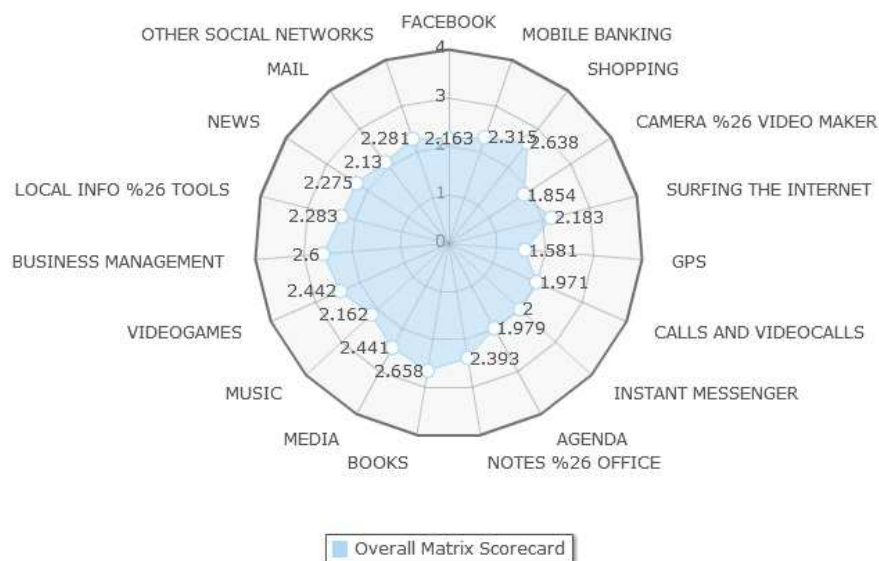
In the English survey 70% replied “NO”, and 48% replied “NO” in the Spanish. Although customers have a lack of technical knowledge about this concept, we can relate these results within the problem of a crowded market. As we focus on the importance of the customers’ choice, surveys show that developing similar devices don’t satisfy the market needs. Innovation is the solution until a line extension problem, where companies can lose competitiveness. Al Ries and Jack Trout talk about that in their 12<sup>th</sup> immutable law of marketing, the Line Extension: *“One day a company is tightly focused on a single product that is highly profitable. The next day the same company is spread thin over many products and is losing money. When you try to be all things to all people, you inevitably wind up in trouble. “I’d rather be strong somewhere,” said one manager, “than weak everywhere.”*

### 8° Question: “Which tasks do you use daily with your mobile devices?”

Software is more important since the innovation took a new direction with mobile devices.

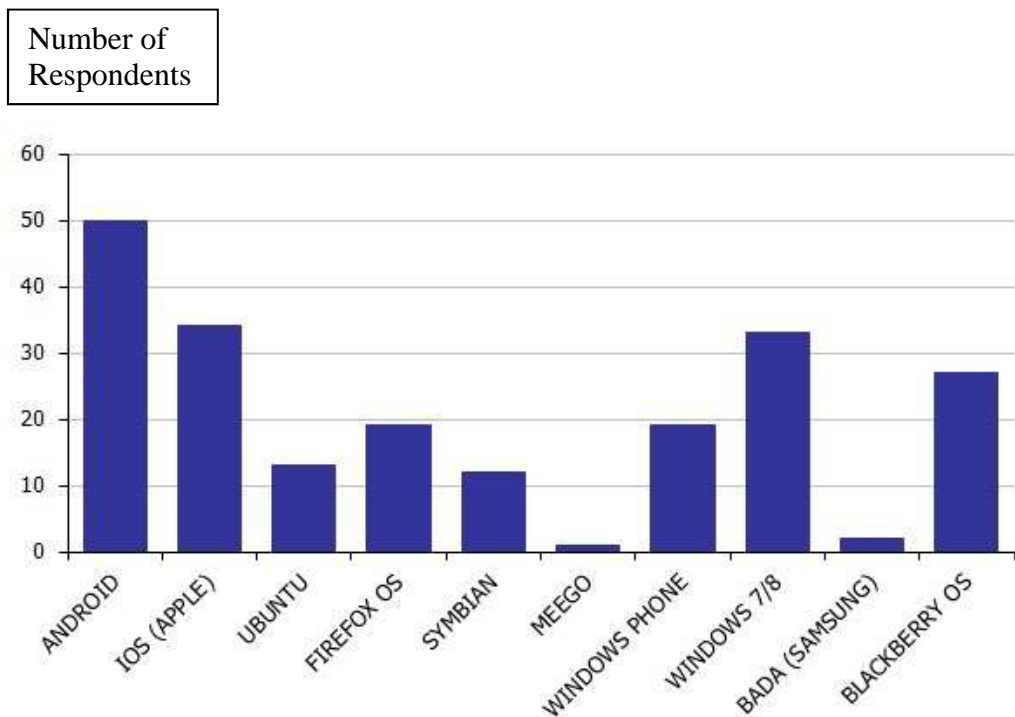
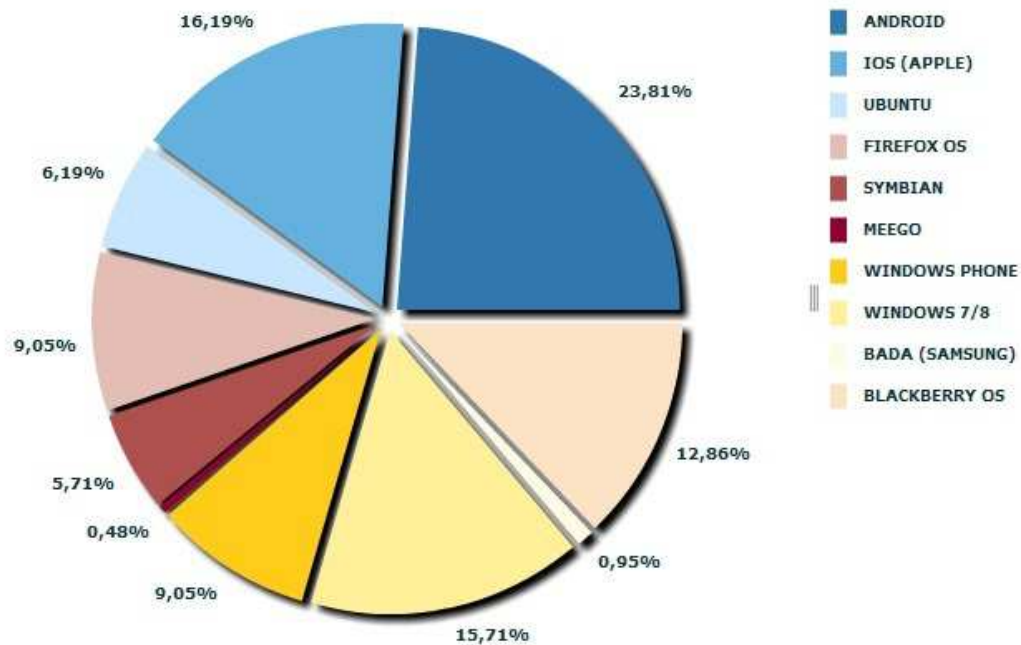
People changed the way they use technology as they live connected everywhere, where most of the tasks need an internet connection. Social networks, business and office management, videogames, media entertainment and books, shopping and mobile banking are the most valued tasks. Besides, all the tasks surveyed got big number of replies, which place the innovation for new device uses as a lure to new customers.

Overall Matrix Scorecard : WHICH TASKS DO YOU USE DAILY WITH YOUR MOBILE DEVICES?						
Question	Count	Score	SMARTPHONE	TABLET	LAPTOP	GAME-STATION & OTHER MOBILE DEVICES
1. FACEBOOK	92	2.163				
2. OTHER SOCIAL NETWORKS	64	2.281				
3. MAIL	92	2.130				
4. NEWS	69	2.275				
5. LOCAL INFO & TOOLS	53	2.283				
6. BUSINESS MANAGEMENT	30	2.600				
7. VIDEO-GAMES	43	2.442				
8. MUSIC	80	2.162				
9. MEDIA	59	2.441				
10. BOOKS	38	2.658				
11. NOTES & OFFICE	56	2.393				
12. AGENDA	47	1.979				
13. INSTANT MESSENGER	43	2.000				
14. CALLS AND VIDEO-CALLS	69	1.971				
15. GPS	43	1.581				
16. SURFING THE INTERNET	82	2.183				
17. CAMERA & VIDEO MAKER	48	1.854				
18. SHOPPING	47	2.638				
19. MOBILE BANKING	54	2.315				
Average		2.229				



9° Question: “Which operating systems do you know/use?”

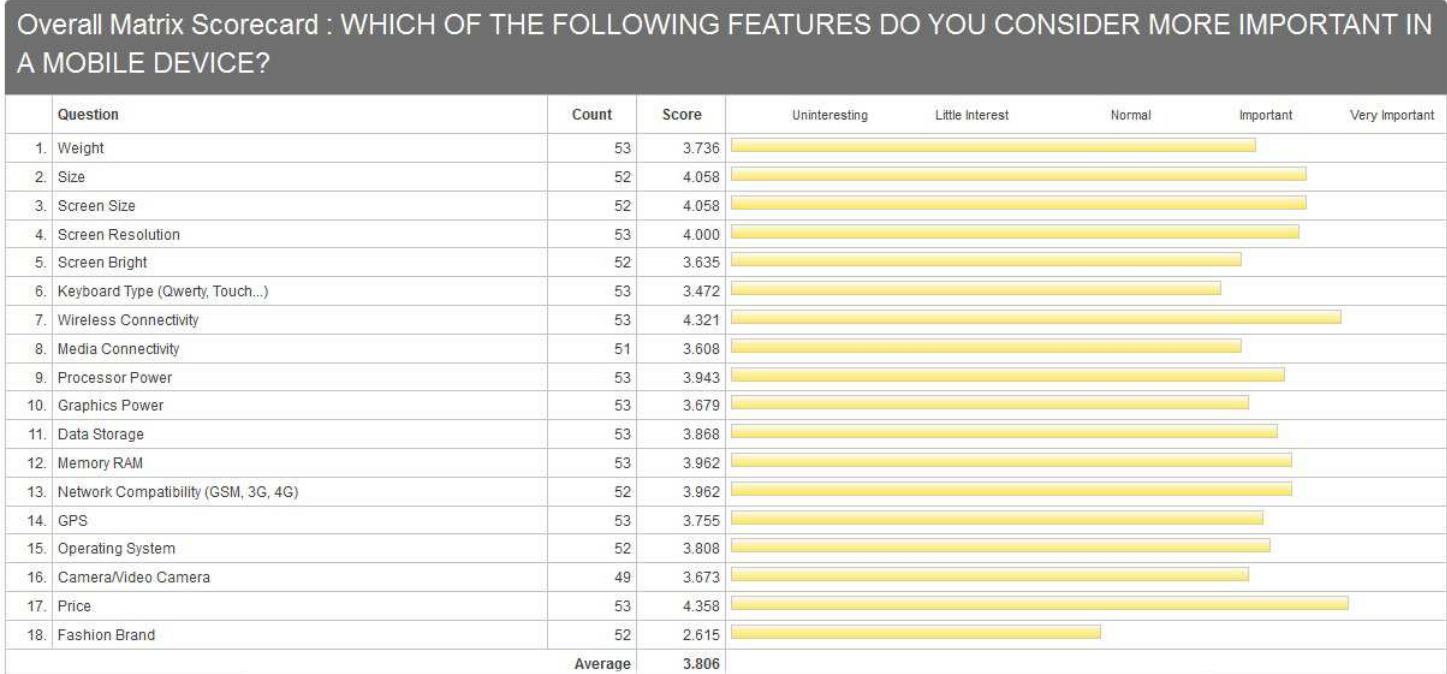
Surveys show the important role of the OS, as most of companies don't use their own software. Most valued OS are Android (owned by Google, which also owns Motorola), IOS (Apple) and the Microsoft's Windows.





## 10° Question: “Which of the following features do you consider more important in a mobile device?”

Last question provides the thesis with a large amount of data about customers’ behavior and their preferences before buying a device.



Size of the phone, screen resolution and the screen size are the first group of the most valued features. The second big group is mobile networks and WIFI connectivity. The third group is the price, with a score 4.358 points (the average is 3.806 between 18 features). It is the most rated point and an interesting strategy to obtain market share. What range of prices could offer the companies? It can be decisive before buying one devices or another.

## **SURVEYS’ RESULTS**

Surveys give us a lot of information about costumers’ behavior, but this information doesn’t fulfill all the requirements to reply the research questions. This chapter analyzes briefly which are the most famous devices and specifications for customers, how they respond to the market offers and how they face to the different devices in market:

The first four questions focus on users and their devices. Smartphones are the most popular devices before tablets, laptops and game stations with most of users belonging to the range of 19-

30 years old. On the other hand, although smartphones and tablets lead the pack, users resist leaving their personal computers (as PCs or laptops). They use 1-3 devices, always with a smartphone and laptop as principal sample of the surveys.

If we could join all the specifications of computers and Smartphones in one device, could we say that we have a dominant design able to fill homes with it?

Some companies as Microsoft and Canonical, are trying today to join their desktop OS with smartphones' OS (Windows 8 and Ubuntu), as in some parts of the world customers only use today one device and these markets ask for a single device.

Questions five and six give us information about the customers' choices: they prefer medium size or small devices, and the most famous companies in those ranges are Apple or the Android's partners (which sell their devices with the Google's OS). Some famous companies don't show their popularity with sales, as can be Nokia, Motorola and RIM (Blackberry).

Question seven reveals the importance of the marketing and innovation in the dominant design. The market requires some innovative and differentiated devices, between hundreds of devices which collapse the stores, and do not fulfill the customers' needs.

Questions eight, nine and ten enforce the dependency from the computers and their usages. Connectivity and the OS are the main points where innovation is a key factor.

Price becomes as the most important result of the surveys. Most of respondents affirmed that the price is the most important feature in a mobile device, which can determinate the direction of our innovation model, and conduct the concept of dominant design into cheaper device in a price war.

## **PAST & FUTURE: COMPANIES AND THEIR PROJECTS**

Market is evolving constantly and even more companies are joining the innovation race in order to take a place with their devices. Hundreds of new devices appear every semester and the biggest companies make a competition, about microprocessors and memory ram, more like the old computer's market (high-end devices from Samsung, HTC, SONY, LG, Apple and others). Apart from that, videogames and applications' market (apps from now) try to cover all the issues they can, with innovative systems of gaming (using tools as the gyroscope and touch screen), new devices related with mobile devices and their shops of apps and media (OUYA, "the first true open gaming platform"), and modern systems of raising and business (funds from advertising or premium apps).

On the other hand, some of the biggest groups are developing new technologies, gadgets or devices related directly with this market. All are directly influenced by the market growth and the new mobile devices. Also some multinational companies establish some consortium, in order to strengthen some technologies developed together, some OS and other platforms (as Firefox OS or Ubuntu for Android).

### **OUYA, THE FIRST TRUE OPEN GAMING PLATFORM**

OS' competition is emerging again on mobile devices between some of the most important companies nowadays: Apple (IOs), Microsoft (Windows 8, Windows Phone), Google (Android), RIM (Blackberry OS)... and they came to stay here for a long time. Markets, Stores, and Media & Apps shops are strengthening the user's choices, and the importance of this OS is increasing every day.

One of the best examples of this phenomenon is the Google's OS, called Android, which is used by most of companies and developers due to an Open Source project (it means that everybody can read, modify and redistribute the OS code). Android and OS are getting an important role in the dominant design definition as they can be the key for the future devices as OUYA tries [11] [12].

OUYA claims to be the "first true open gaming platform" based in an Android OS. OUYA is offered from a reduced price with a Bluetooth controller, power adaptor and a HDMI cable. It's a gaming platform, aimed to use in a big screen or TV, where games are free and gadgets are very

cheap. It tries to use the High Definition 1080p resolution and offer developers a kick start kit to develop big or small videogames, but always with the main idea of a free open system, where there are not only videogames, as you can use the Android's ecosystem with all the apps, movies, shows, music, books...

OUYA also welcome hackers. It uses standard screws and it's easy to root. They will be able to create their own peripherals also were able to access to the main hardware design.

How strong are connected the Android's smartphones with this type of hardware? Android captured today around the 70% of the smartphones market [13] and is conquering also other markets. Is Android a dominant design today? At least as OS could?

## **GOOGLE GLASSES, THE FUTURE OF SMARTPHONES**

More like a cyborg futurist gadget, the Google's Glasses appeared on the net like a revolutionary device of enhanced reality, and it will be ready in the end of 2013 or the beginning of 2014 [14]. Far from science fiction, the glasses let you record video, make pictures, show what you see and other uses without using your hands, just ask briefly to the glasses a sentence like "ok glass, record a video". The device brings a 640x360 display, a 5 megapixel camera capable of video 720p, 16 GB of flash memory, Bluetooth and Wi-Fi [15]. It lets you to use the cloud Google Drive, to synchronize with you smartphone and use some apps like GPS and SMS.

There are new mobile devices, maybe only prototypes, but many companies are also developing their own glasses, as a new device related directly with smartphones, and who knows maybe, as a replacement of them.

## **FIREFOX OS**

"We're enabling operators, phone manufacturers and developers to manage, customize and improve relationships with their customers directly through our mobile products: Firefox OS, Firefox Marketplace and Firefox for Android." Mozilla Foundation [16]

Mozilla Foundation brings to the market an open platform built entirely using HTML5 and other standards. They focus all the Firefox's experience obtained for the last 15 years in a new OS in a level playing field against others. They offer ownership and control over relationships with customers, customized phones according to the needs of the different target markets and a big participation in the chain value.

Nowadays, some of their partners are Qualcomm, LG, Telenor, Telefonica, ZTE, Twitter, Ebay, or Disney among others, offering also their own marketplace and the Firefox navigator for Android, becoming one of the most important OS in a short-medium term in the world of mobile devices, and a big competitor with an innovative design and great support behind.

## **DESKTOP UBUNTU PLUS MOBILE UNBUNTU, EQUAL, FOR ANDROID**

“How would you like a PC that fits in your pocket?”

“In every dual-core phone, there’s a PC trying to get out.” Canonical & Ubuntu Ltd.

This is how Ubuntu starts its new challenge for phones, a new sight of the market’s evolution giving solutions to one of the most important dilemmas for customers: “should I buy a computer or a mobile device?” [17].

Both are daily uses but one device cannot solve alone all the needs required. In this way, Ubuntu is jumping to Android’s devices offering a desktop OS from your phone: “So users get the Android they know on the move, but when they connect their phone to a monitor, mouse and keyboard, it becomes a PC.”

Just this, Ubuntu is as an “app” for Android able to offer a desktop OS only connecting the phone to a keyboard, mouse and display, taking advantage of the powerful smartphones in the market, only needed a dual-core processor (1Ghz Cortex A9), 512 MG - 1 GB of memory ram, and a multi-touch screen [18]. It offers to maximize the use of your powerful phone, using daily a single device, and also taking advantage of the LTE networks. Customers can unify their contacts, photos, calendar, social networks... without interoperate between the phone and the computer all the time, using both phone and desktop computer in the big display at home or office [19]

Will Ubuntu define the dominant design of mobile devices? These are only some of the next projects we will see in a near future, which can re-define how the market evolves.

## INTERVIEWS

The interviews have been carried out in the context of the empirical case, as a tool to understand how the companies design their strategies facing an important project as a new mobile device is. Five interviews were made to professionals of the technology and mobile device sector, workers in the following type of companies: Mobile Phone Operators, Mobile Developers, Software and Hardware Developers, Consulting & Training, Project Management... They were consulted about the same structure questions in order to relate this information and get a global conclusion ready to focus on the thesis topic: the dominant design in mobile device market.

The first interviewee works as a commercial sales in a consulting company and understand the dominant design as the device which “sets a trend, and is imitated by others”, as the Apple iPhone does with its hardware and OS. The interviewee highlights that computers are still independent and won't be replaced by mobile devices (they are closer to converge with TVs), as mobile devices still depend from computers' architecture. The interviewee focuses in customers' likes and innovation as tools to get success before cheap prices, and future designs as gadgets connected to our mobile device, the cloud and the folding screen. About companies, warns about keeping technology and stopping innovation, as Nokia did with its OS, and highlight cases as Apple, placing also in the market some devices competing between them, prioritizing the innovation (iPod, iPhone, iPad).

The second interviewee works in a project management company and describes dominant design as an unofficial standards used for a group of people. It could be one in mobile devices, but a generic one, as a thin phone with a touchable screen (today an underpowered standard in mobile phones, where Apple and Samsung are the biggest groups). About companies and its strategy, the interviewee says that the first point would be deciding one (follow the leader, break into the market, market niche) and the second point how to break in this strategy (his company works with a telephone operator with a solid career, looking for important partners to keep on top as a modern company). Replying about new features and customers' demands, the interviewee asserted that there is a difficult to predict new products, but they would follow a software upgradeable philosophy (focusing on connectivity and cloud). Finally, asking about computers and mobile devices ensured that remote OS won't get the place instead of desktop OS in a medium term, as the computers' experience is still unique today, and the innovation is the only way to keep in success or come back again (nothing is forever, but Nokia keep its OS before

keeping innovating). If Motorola's focus were different it will be able to reborn, but maybe not as a smartphones developer... if not as chip developer and partner.

Third interviewee works in a chip developer company and talks about the dominant design as one that reaches more than the 30% of the market share (but as a family of devices, not as a standard design/model, which can create an ecosystem of applications around and keep loyalty from customers). The interviewee consider that every company choose its own strategy based on the camera, apps, OS, screen... but they have to follow two basic points for a successful strategy: aim to the leaders as Apple or Samsung and innovation and investing in R&D, trying to ensure your place in the market. Asking about computers and smartphones, the interviewee replied that the danger couldn't come from new software as Ubuntu or Firefox, if not from the same manufacturers, as they are converging computers and mobile devices with the same hardware. Talking about Nokia and Motorola, the answers were that everything has an end, and innovation is the key to survive when you are on top and requirements are higher. Motorola has a difficult way to return, as companies don't depend completely on themselves, as R&D can reduces your margins and sometimes you can't control the assembly lines, which reduce your ability to reply to customers' demands.

As the last point, the fourth interviewee, worker in a consulting & training company, describe the dominant design as a double attraction device: which cause interest and satisfaction to customers and imitation from competitors (as Apple and Samsung do). His company is a leader of the market with high performance services and systems (also technical support working under the Blackberry's Platform), and from these experiences, he recommends three previous questions before launch a new device: Will we be able to offer a product with a competitive advantage? If we offer new features, will they get success? Are there enough requests to return the investment? Again one of the interviewees assert that Smartphones are not getting the market share of computers, as they don't offer the same experience and therefore, they can't be replaced by each other. About future features for mobile devices replied that predictions can only go wrong, this is the reason because he doesn't make predictions about technology markets.

Finally, talking about Nokia, expressed that nobody can be on top by chance, although Nokia did a big mistake by keeping the same old ideas that worked once before, but not anymore (He commented that he has no idea about the Motorola's situation, so he didn't want to make an evaluation about that).

Summarizing the four interviews, the thesis analyses many points of the questions answered looking for converging points. About computers and mobile devices, the interviewees agree that computers won't be replaced, as mobile devices don't offer today the same experience for the user. Although some potential mobile device evolutions were suggested to the interviewees, they considered that the market is enough mature, so only a new device with both user experiences would be a new device. Interviewees also remarked strongly the need of innovations in order to choose the best strategy for the company and keep a place on market. All the interviewees talked about the Nokia's OS as one of the weakest points of the company before leaving the market top, and most of them believe in a Motorola's return, but as partner or technology developer, not as a big manufacturer.

All of them emphasizes in the difficulty of defining a dominant design, as it is not a concrete concept, although the current trend in market is following a leading company and its designs are imitated by competitors and desired by customers.



## 5 DISCUSSION AND CONCLUSIONS

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*A discussion of the results and the conclusions that the authors have drawn during the Master of Science thesis are presented in this chapter. The conclusions are based from the analysis with the intention to answer the formulation of questions that is presented in Chapter 1.*

### 5.1 Discussion

After finishing the theoretical framework and the hypothesis, the discussion of the research is being developed before the main conclusions of the research are presented. The concepts and the model obtained from the literature review are contrasted one to one with the surveys, data collected and the interviews.

The Utterback's model treated in the theoretical model studies and links the characteristics of the product, process, competition and organization (describing the changing rates of product and process innovation over time). The dominant design defined in this model is a pioneer product, born from innovation, which inspire new competitors and wins the allegiance of the market place. It has to be imitated and followed by innovators and competitors, and it cannot be recognized except in retrospect. The model appears summarize here before compared with the empirical research:

Fluid Phase: innovation enters the market providing functionalities not provided before. All the competitors sell similar goods between them and the goods are nonstandard as there is not a dominant design yet. Companies have no clear idea where to invest in R&D so goods differentiation comes from each good performance. The most important fact in marketing in this phase is being first in the customer's mind.

Transitional Phase: the emergence of a dominant design and the product innovation are accepted in the market. The competitive emphasis is focused on products for more specific customers, as now the companies know better their needs. How they perceive and categorize the products are the main marketing areas of the innovation phase.

Specific Phase: in the last phase, the product and process innovation rates decrease approach, and the productive system is standardized. Now the performance and cost reduction are the main priorities for the companies.

The data collection of the surveys is centered in the transitional and specific phases, as the companies try to know the customer needs and preferences about the new product innovation. The results point to smartphones as the favorite device where the dominant design is a

small/medium size device, with the last connectivity innovation and an OS as Android (Google) or IOs (Apple): *“the one that wins the allegiance of the market place, the one that competitors and innovators must adhere to if they hope to command significant market following”* (Mastering the Dynamics of Innovation, J.M. Utterback). Price is the most important result of the surveys and converges with the Specific Phase, as cost reduction and price are key when the productive system is standardized. *“The value ratio of quality to cost becomes the basis of competition. Products in the specific phase become highly defined, and the differences between products of competitors are often fewer than the similarities.”* (Mastering the Dynamics of Innovation, J.M. Utterback)

The four innovation products analyzed in the chapter 4 give us an example about how are the product and process innovation rates growths depending the different phases of the model. The OUYA game station is the first innovation/device to analyze. It fits clearly in the fluid phase, as it is a product innovation, between mobile devices and game station markets (it is a game station with and mobile OS). Time will say if it is a new dominant design in the market or just another innovation between markets. Google glasses appear more differentiated than OUYA as a new possible design, although in this case the innovation process is stronger and the devices are more differentiated from other goods. If it does not grow properly in the market, we could place the glasses in the Specific Phase, as a low probably innovative product, but the efforts of the market are showing some competitors trying to imitate the Google's design [20]: *“a pioneering firm gets the ball rolling with its initial product, a growing market begins to take shape around that product, and new competitors are inspired to enter and either expand the market further or take a chunk of it with their own product versions. No firm has a lock on the market”* (Mastering the Dynamics of Innovation, J.M. Utterback).

Ubuntu and Firefox appear as depending APP/OS from Android in mobile devices and a new OS respectively. Both emerge in the Transitional Phase as new innovations for more specific smartphones/tablets users. The dominant design is establish and the companies try to get a place in the market after the user needs are more clearly understood. We can also place them in the first part of the Specific Phase, when competitors differentiate themselves with performance and cost reduction.

The four interviews were made to 4 professionals who work indirectly in this sector, so the information collected cannot be trusted as a powerful source due the small amount of the sample, and the subjective character of the questions.

These four persons view the dominant design similar to the Utterback's definition: an innovative design desired by customers and imitated by competitors. This statement is clearly related with the Specific Phase, where the dominant design is established and the companies have a clear idea about what the customer wants. The strategies suggested fit perfectly with the strategies declared in the 3 phases of the model: get the innovative advantage (innovation not provided before), follow the leader (competitors have similar goods), and "keep moving" on innovation performance. They also confirmed the importance of the R&D in the second and third phases, as many companies like Nokia can find on product performance and cost reduction the path to innovation and stay competitive in the market.

Data obtained from interviews were more interesting and useful than surveys, as the point of view of the experienced follows mostly the Utterback's model for the innovation cycle.

## **5.2 Conclusions**

In order to find the main conclusions of the thesis, it will reply the research questions, as a guide to complete the analyses pointed by the method:

- 1- Which are the costumers' demands and needs? How can we relate this information with the dominant design?

Customers demand small/medium size devices (smartphones and tablets), with good connectivity and mostly with the main OS of the market: Android (Google) and IOs (Apple). A good price is clearly the most important demand from customer, mainly when the product and process rates of an innovation cycle decrease, and the dominant design is fully developed in the market.

Customers demand innovative products when products performance and cost reduction begin the most important points of the company's strategy.

The second and the third phases of the innovation model focus on the needs of the users (product performance) as the competitive key in the market. Without these data, companies don't know where to focus clearly their R&D bets and how to face the market successfully.

- 2- What is the strategy of the firm before designing a device? Do they use a concept similar to a dominant design?

Companies need to know how much developed is the market. After that, they design an strategy depending which phase of the innovation's cycle is being carried out: Fluid Phase – The Law of Leadership (where they can provide an innovative product not provided before), Transitional Phase (the dominant design is established and they face the market with similar goods, focusing on the needs of the users), or the Specific Phase (the production is standardized and companies aim to product performance and cost reduction as differentiators)

All the companies use a concept similar to the dominant design, maybe with different innovation models, but always following a cyclic process where dominant designs appear in the markets.

Dominant design is a dynamic concept which high-tech companies focus their devices and projects. Nowadays the phase of this cycle for smartphones would be the Specific Phase, where a dominant design is establish some time ago, the productive system is standardized with hundreds of manufacturers/developers, and the companies know clearly what the needs of the users are. The research conducted see that today, companies focus on cost reduction and product performance, while they invest in their R&D departments, looking for an innovative differentiator, either finding another innovation in the same market, or finding a new dominant design.

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# APPENDIX A: ENGLISH SURVEY

## MOBILE DEVICES – DOMINANT DESIGN

### HOW OLD ARE YOU?

- ☐ 8-14 >
- ☐ 15-18 >
- ☐ 19-25 >
- ☐ 26-30 >
- ☐ 31-40 >
- ☐ +41 >

### WHICH MOBILE DEVICES DO YOU HAVE?

- ☐ Smartphone
- ☐ Tablet
- ☐ Tablet + Keyboard
- ☐ Convertible Laptop (Laptop with Touchscreen & Sim Card)
- ☐ Camera with Sim Card
- ☐ Game Station with Sim Card
- ☐ Other Mobile Devices

### WHICH OF THE FOLLOWING DEVICES DO YOU AIM FOR YOUR NEXT PURCHASE?

	Unlikely	Likely	Most Likely
Laptop, Desktop PC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smartphone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tablet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Camera with Operating System	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tablet + Keyboard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Game Station	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Mobile Devices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### HOW MANY MOBILE DEVICES DO YOU HAVE?

- ☐ 0 >
- ☐ 1 >
- ☐ 2 >
- ☐ 3 >
- ☐ +3 >

**DO YOU KNOW THE FOLLOWING BRANDS OF MOBILE DEVICES?**

- ☐ HTC
- ☐ ASUS
- ☐ SAMSUNG
- ☐ APPLE
- ☐ LG
- ☐ SONY
- ☐ ZTE
- ☐ HUAWEI
- ☐ LENOVO
- ☐ INTEL
- ☐ DELL
- ☐ BRIGMTON
- ☐ BLUE SENS
- ☐ BQ
- ☐ WOXTER
- ☐ GOCLEVER
- ☐ ARCHOS
- ☐ HP
- ☐ ACER
- ☐ MOTOROLA
- ☐ NOKIA
- ☐ BLACKBERRY

**WHICH SCREEN SIZES DO YOU PREFER?**

- ☐ 3"-4.5"
- ☐ 4.6"-6.9"
- ☐ 7"-10"
- ☐ 10.1"-10.9"
- ☐ 11"-11.9"
- ☐ 12"-13"
- ☐ +13"

**NOWADAYS THERE ARE A VARIETY OF MOBILE DEVICES.**

**DO YOU THINK THAT THEY WILL EVOLVE INTO A SINGLE DOMINANT DESIGN?**

- ☐ Yes [➤](#)
- ☐ No [➤](#)

**WHICH TASKS DO YOU USE DAILY WITH YOUR MOBILE DEVICES?**

	SMARTPHONE	TABLET	LAPTOP	GAME-STATION & OTHER MOBILE DEVICES
FACEBOOK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER SOCIAL NETWORKS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MAIL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NEWS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LOCAL INFO & TOOLS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BUSINESS MANAGEMENT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VIDEO-GAMES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MUSIC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MEDIA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BOOKS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NOTES & OFFICE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AGENDA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INSTANT MESSENGER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CALLS AND VIDEO-CALLS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GPS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SURFING THE INTERNET	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CAMERA & VIDEO MAKER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SHOPPING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MOBILE BANKING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



**WHICH OPERATING SYSTEMS DO YOU KNOW/USE?**

- ☐ ANDROID
- ☐ IOS (APPLE)
- ☐ UBUNTU
- ☐ FIREFOX OS
- ☐ SYMBIAN
- ☐ MEEGO
- ☐ WINDOWS PHONE
- ☐ WINDOWS 7/8
- ☐ BADA (SAMSUNG)
- ☐ BLACKBERRY OS

**WHICH OF THE FOLLOWING FEATURES DO YOU CONSIDER MORE IMPORTANT IN A MOBILE DEVICE?**

	Uninteresting	Little Interest	Normal	Important	Very Important
Weight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Size	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Screen Size	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Screen Resolution	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Screen Bright	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keyboard Type (Qwerty, Touch...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wireless Connectivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Media Connectivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Processor Power	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Graphics Power	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Data Storage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Memory RAM	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Network Compatibility (GSM, 3G, 4G)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GPS	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operating System	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Camera/Video Camera	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fashion Brand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

# APPENDIX B: SPANISH SURVEY

## DISPOSITIVOS MÓVILES - DISEÑO DOMINANTE

### 1.- DISPOSITIVOS MÓVILES - DISEÑO DOMINANTE

#### 1. ¿CUÁL ES SU EDAD?

- ☐ 8-14
- ☐ 15-18
- ☐ 19-25
- ☐ 26-30
- ☐ 31-40
- ☐ +41

#### 2. ¿QUÉ DISPOSITIVOS MÓVILES TIENE?

- ☐ Smartphone
- ☐ Tablet
- ☐ Tablet + Teclado
- ☐ Portatil Convertible (Portatil con Pantalla Táctil & Tarjeta SIM)
- ☐ Camara con Tarjeta SIM
- ☐ Video-Consola con Tarjeta SIM
- ☐ Otros Dispositivos Móviles

#### 3. ¿CUÁL DE LOS SIGUIENTES DISPOSITIVOS MÓVILES PODRÍA CONVERTIRSE EN SU PRÓXIMA COMPRA?

	Poco probable	Bastante probable	Posiblemente
Ordenador de Sobremesa, Portátil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smartphone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tablet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cámara con Sistema Operativo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tablet + Teclado	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Video Consola con Tarjeta SIM	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Otros dispositivos móviles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### 4. ¿CUÁNTOS DISPOSITIVOS MÓVILES TIENE ACTUALMENTE?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ +3

**5. ¿CUÁLES DE LAS SIGUIENTES MARCAS PARA DISPOSITIVOS MÓVILES CONOCE?**

- ☐ HTC
- ☐ ASUS
- ☐ SAMSUNG
- ☐ APPLE
- ☐ LG
- ☐ SONY
- ☐ ZTE
- ☐ HUAWEI
- ☐ LENOVO
- ☐ INTEL
- ☐ DELL
- ☐ BRIGMTON
- ☐ BLUE SENS
- ☐ BQ
- ☐ WOXTER
- ☐ GOCLEVER
- ☐ ARCHOS
- ☐ HP
- ☐ ACER
- ☐ MOTOROLA
- ☐ NOKIA
- ☐ BLACKBERRY

**6. ¿QUÉ TAMAÑO DE PANTALLA PREFIERE PARA SUS DISPOSITIVOS MÓVILES?**

- ☐ 3"-4.5"
- ☐ 4.6"-6.9"
- ☐ 7"-10"
- ☐ 10.1"-10.9"
- ☐ 11"-11.9"
- ☐ 12"-13"
- ☐ +13"

**7. A DÍA DE HOY HAY UNA GRAN VARIEDAD DE DISPOSITIVOS MÓVILES EN EL MERCADO.  
¿CRÉE QUE DE AQUÍ A UN FUTURO EVOLUCIONARÁN HACIA UN ÚNICO DISEÑO DOMINANTE?**

- ☐ Sí
- ☐ No

## 8. ¿QUÉ TAREAS O APLICACIONES USA EN SU VIDA COTIDIANA CON SUS DISPOSITIVOS MÓVILES?

	SMARTPHONE	TABLET	PORTÁTIL	VIDEOCONSOLAS	OTROS DISPOSITIVOS MÓVILES
FACEBOOK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTRAS REDES SOCIALES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CORREO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NOTICIAS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INFORMACIÓN LOCAL & HERRAMIENTAS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NEGOCIOS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MÚSICA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MULTIMEDIA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LIBROS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NOTAS & OFICINA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AGENDA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MENSAJERÍA INSTANTÁNEA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LLAMADAS Y VIDEO-LLAMADAS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GPS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NAVEGAR POR INTERNET	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CÁMARA DE FOTOS & GRABACIÓN DE VIDEO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COMPRAS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BANCO EN EL MÓVIL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 9. ¿QUÉ SISTEMAS OPERATIVOS PARA DISPOSITIVOS MÓVILES CONOCE/USA HABITUALMENTE?

- ☐ ANDROID
- ☐ IOS (APPLE)
- ☐ UBUNTU
- ☐ FIREFOX OS
- ☐ SYMBIAN
- ☐ MEEGO
- ☐ WINDOWS PHONE
- ☐ WINDOWS 7/8
- ☐ BADA (SAMSUNG)
- ☐ BLACKBERRY OS

## 10. ¿CUÁLES DE LAS SIGUIENTES ESPECIFICACIONES CONSIDERA MÁS IMPORTANTE EN UN DISPOSITIVO MÓVIL?

	Sin Interés	Poco Interesante	Normal	Importante	Muy Importante
Peso	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tamaño	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tamaño de la Pantalla	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resolución de la Pantalla	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Brillo de la Pantalla	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tipo de Teclado (Qwerty, Táctil...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conectividad Inalámbrica	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conectividad Multimedia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Potencia del Procesador	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Potencia Gráfica	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Capacidad de memoria de almacenamiento	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Memoria RAM	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tipo de red (GSM, 3G, 4G)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GPS	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sistema Operativo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cámara/Video Cámara	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Precio	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marca	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## APPENDIX C: THE INTERVIEW

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### Interview

#### Mobile Devices: Dominant Design as a Goal

This thesis focus on the analysis and definition of which a dominant design is and how we should understand this concept: which steps follow the companies before designing a device, how they face the market, if they have a brand image philosophy, or if they use a common concept in their projects.

It also analyzes the costumers' behavior: how the costumers respond to the market, which are the most famous specifications for customers, and how can we relate this information within the concept aimed: the dominant design.

Surveys, data collected and interviews will integrate the hypothesis. It will be contrasted with the theoretical framework in order to perform the thesis analyses through the discussion and conclusions, aiming to describe the concept on which is developing the mobile device market.

- For a proper use of the information provided the following data are required (All personal data provided in this interview will be confidential and not be published in this thesis):

COMPANY NAME	
INTERVIEWEE NAME	
COMPANY ACTIVITY / MARKET NICHE	
INTERVIEWEE ACTIVITY WITHIN THE COMPANY	

- 1- The market is full of many mobile devices difficult to differentiate between them, while they beat sales at the expense of other devices which are stealing market share: PCs and laptops. What do you mean by a dominant design? Do you think there is any today within the mobile devices or could exist?

- 2- This thesis attempts to define a phenomenon that is currently being developed in the mobile device market. The market is evolving into devices born of the union of telephones and computers in one, which have appeared hundreds of designs, models and brands which companies look forward to be a commercial and technological referent. Is there a concept of "dominant design" or "brand line" in the companies, in order to develop their products in this market? What are their foundations?
- 3- The mobile device market can be too broad, making difficult the approach on market sectors in which focus the products, whether developed by the company or managed through a telecom operator. Which are the first steps that every company should follow before launching into develop a new product?
- 4- Technology advances rapidly evolving in new devices born of hundreds of prototypes developed by companies, although many of them will never succeed or won't be performed. Which do you think are the potential features of tomorrow's mobile devices? What would be the most demanded by customers?
- 5- Applications on mobile devices have revolutionized the world of software, giving to innovation a big role in the daily life of technology. Some systems such as Android or IOs are well established, but others like Firefox and Ubuntu try to break into the market. What do you think of these new alternatives? Some like Ubuntu try to offer both the mobile system and desktop, previously connecting to an external display. Do you see in danger the future of PCs and laptops with these initiatives?
- 6- Apple and Android are being the leaders in the market with their devices and their operating systems, while other companies follow this trail or make commercial alliances to achieve that level of competition. What kind of strategy follows your company today: market leader, market second line, telephone operator with commercial partnerships, others...?
- 7- Some companies like Nokia failed when they ignored some market factors as was the "boom" of touch screens. Why do you think it happened to Nokia and not to others?
- 8- Today, Motorola has been restructured inside the Google's group, and overlooking to develop new projects. How do you see one of the "old market giants" today? Do you think there is enough space in the market for returning to a high competitive level?